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ABSTRACT

This longitudinal, ethological study explores the development of communication behaviors, different types of social peer interactions, and mother-child interaction among 15 boys and 15 girls from 16 through 30 months of age. Each subject was filmed twice each month over a period of 14 months while he or she had lunch with 5 peers. Several subjects were videotaped at home with their mothers in feeding situations when they were between 18 and 24 months of age. Findings indicate that (1) the non-agonistic interactions and the contact-initiating behavior with peers increases significantly at the end of the second year and especially during the first half of the child's third year; (2) from 18 months, agonistic interactions tend to decrease; (3) duration of dyadic interaction is the same as that for polyadic interactions; (4) boys more often than girls are involved in social interactions and contact-initiating behavior with peers; (5) mothers and toddlers make relatively equal contributions to non-agonistic interactions and soliciting behavior; and (6) during the period between 19 through 24 months, the frequency of mother-toddler non-agonistic and agonistic interaction is significantly higher than the frequency of these types of interaction among toddler and peers. However, the percentage of agonistic interaction is relatively the same in mother-toddler and toddler-peer interaction. (RH)

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STUDY OF COMMUNICATION BEHAVIOUR IN CHILDREN ; PEER AND MOTHER - TODDLER INTERACTION.

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Introduction

The ethological approach of behaviour studies in children has been fruitful (BLURTON-JONES,1972; McGREW,1972,HINDE, 1974, HINDE et al.,1982, 1983, EIBL-EIBESFELDT, 1979, 1984; MONTAGNER, 1978; STRAYER; 1978; 1981; TREMBLAY, PROVOST ET STRAYER, 1985).
Recently the study of young children's social behaviour has received a great deal of attention . However,an important developmental period has been relatively neglected :the period of transition from infancy to childhood. Most of the studies have been carried out in free play activities during the pre-school years .
Very early the young child develops a series of behaviours which enables him to communicate with his peers. This social interaction is an ideal opportunity for the development of communication systems, reciprocal exchanges and the apprenticeship of social roles (HARTUP, 1975; MUELLER and LUCAS, 1975; LEWIS and ROSENBLUM, 1975; SCHAFFER, 1984; Le CAMUS 1985).
VINCZE (1971) indicated that after the age of 7 months children are ready for social contact : they exchange glances with peers more and more frequently and mutual smiling and laughing can be observed at this age. Before walking serious conflicts do not occur.
Contrary to BRIDGES (1933) MAUDRAY et al. (1939)and BRONSON (1974, 1981) VINCZE suggested that the social interaction of young children seems to offer more pleasure than discontent. As child motor development progresses the forms of social contact become more and more varied. These results were confirmed by

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the studies of ECKERMAN,WHATLEY and KUTZ (1975) and RUBENSTEIN and HOWES (1976).
HOWES (1980) considered that the vital interest in relation to peers is shown at the age of 24 months. At this age the interaction sequences are short, but they mark the emergence of complex social interactions.
Many researchers have indicated that during the child's second year of life he engages in social exchange with his peers. The nature of this exchange is usually "positive" (LEWIS and ROSENBLUM, 1975 ; MUELLER and BRENNER, 1977 ; ROSS,GOLDMAN and HAY,1979).
However, little is known about the developmental changes in peer communication during the first 3 years of life in a natural setting and nothing is said about the nature of polyadic interaction when 3 or more peers are simultaneously engaged in a common exchange (TRUDEL et al., 1983; SCHAFFER, 1984).
In the study of child behaviour, a great role was attributed to the mother- child interaction in the development of social skills with peers.The psychoanalytical theory has insisted on the anteriority and the determinism of the mother-child relationship . Moreover , BOWLBY (1969) reenforced this tendency when he considered the mother-child attachment as a biological necessity for the survival of the child.
Many studies have indicated that the mother-child relationship can interfere with the exploration activities of the young child, his reaction in relation to a stranger and his skill in a peer group (AINSWORTH et al.,1972 ; MAHLER et al.,1975; MATAS et al.;1978 ;SROUFE and WATERS ; 1977).
Some studies suggest that the mother's early interaction with her infant may facilitate and interfere with his subsequent adaptive development (e.g. KLAUS and KENNELL , 1976 ; LEIFER et al.,1972 ; RITVO and SOLNIT ,1958).
According to OSOFSKY and CONNER (1979) it is important to conceptualize how the mother affects the child and the child influences the mother through a reciprocal process .Mother-infant interaction was viewed as a bi-directional model; this model indicated an equal maternal and infant contribution. Infant characteristics have been found to affect the mother-infant interaction (FREEDMAN , 1974 ; OSOFSKY , 1976 ;THOMAS and CHESS ,1977).
Morover,peer interaction may have a facilitating effect on the toddlers' social skills with his parents (VANDELL,1979).MUELLER (1979) shows that toddlers who developed long interaction with their peers early in playgroup experience later came to engage in long interactions with thier own mothers.
This investigation deals with the development of communication behaviours and the different types of social peer interactions, be they agonistic or non-agonistic, dyadic or multiadic or of the same or difference sex.The patterns of mother-child interaction has also been examined.

Population and Methods

A. Population

From the beginning of 1982 until the end of 1985, 30 toddlers (15 boys and 15 girls)from 4 differet groups were systematically studied for a period of 14 months for each child in a group of the same age with the numbers in the group varying from 14 to 20 children. These children had all been regularly attending the same Day-Care Centre for at least three months before the study began.
Each child aged from 16 to 30 months was filmed twice per month having lunch with 5 of his/her peers.
The parents of these children both worked full time and were from different socio-professional categories.
The children were at the centre from 9 A.M. until 5 P.M.
Between 18 and 24 months of age,18 of these children were videotaped at home with their mother in feeding situations.

B. Methods

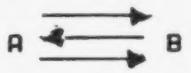
In the Day-Care Centre, the observations took place between 11 AM and 12 noon. Six children were continuously videoed for a period of 30 minutes in a feeding situation. While respecting the normal activites of the children, this observation situation enabled a certain number of variables to be controlled and in particular the number of partners for each child.
The video camera was installed in an adjacent room and filming was done through a one way mirror . The sound was recorded with a microphone hidden close to the children.
The teachers were given instructions to intervene as little as possible so that the behaviour of the children would not be subject to the direct influence of adults.
At home, the filming took place between 7 and 8 PM . The video camera was integrated into the family environment : it worked automatically without an operator.The mother was asked to behave as normallly as possible with her child during the four 30 minutes observation sessions of the child's meal time in her presence.
The analysis of the tapes provided the frequency, duration and structure of the child interaction sequences with peers and or the mother.
The sampling method used was of the focal animal sampling type. Reliability for the frequency and the duration of different types of interactions was obtained and the agreement between the two observers ranged from 85 to 98% .

Results

Peer interaction

1. The non-agonistic social interactions and initiating contacts between peers.

Interaction was defined as when 2 children showed at least 3 alternating actions after 10 seconds of non-interaction (BRONSON, 1981) according to the following model :



A's action modified the behaviour of B within the 5 seconds which followed (FINKELSTEIN et al., 1978) and B's action in its turn modified that of A. The non-agonistic interactions were devoid of any act of grabbing threatening, withdrawing or agression (for the definition of these behaviours see MONTAGNER, 1978 ; RESTOIN et al., 1985). The contact initiating behaviour to begin interacting with a peer is defined as any behaviour by which a child turns in the direction of a peer and then directly addresses him/her.

Figures 1 and 2 show that :

- the frequency and the duration of non-agonistic interaction and contact initiating behaviour with a peer increased from the 16 to 18 month age range to the 19 to 24 month age range and then again in 25 to 30 month age range.

2. Agonistic interactions

In the situations studied the insistant aggressions which bring about crying were rare. However, there was much agonistic behaviour which consisted of one or several grabbing,threatening or aggressive acts. These acts which were mainly dyadic generally bought about refusal, withdrawal, fear or crying behaviour in the receiver.
In the feeding situation the frequency and the duration of agonistic interactions with peers remained relatively stable throughout the period of investigation (figs 1 and 2). However, in relation to the non-agonistic interactions the frequency of agonistic interactions tended to decrease : between 16 and 18 months this behaviour represents 21.6 % of the total interactions with peers; 12,3 % between 19-24 months and 8,8 % between 25-30 months (table 1).

3. Non-agonistic social interactions according to the number of participants in the interaction.

A. Dyadic interactions

Figures 3 and 4 show the frequency and the duration of these interactions. It is relatively stable from 16 to 24 months and increases significantly from 25 to 30 months ($p < .01$, T test).

B. Polyadic interactions including at least 3 children

The frequency of these interactions increases significantly from the age of 19-24 months in relation to 16-18 months ($p < .05$ T test) and increases significantly again from 25-30 months in relation to the two previous periods ($p < .05$; T test). At the same time the duration of these interactions increases significantly at 25-30 months in relation to the previous period from 19-24 months ($p < .05$, T test).
A comparison between the two types of interactions shows that the frequency of the dyadic interactions is significantly higher than polyadic interactions throughout the three periods (fig.3). However, the duration of the dyadic interactions can be compared to that of the polyadic interactions ; there is no significant difference between these two types of interaction durations (figure 4).

4. Social interactions according to sex

A. Non-agonistic interactions and social contact initiating behaviour

Figures 5, 6 and 7 show that the frequency and the duration of non-agonistic interactions and contact initiating behaviour are higher in boys than in girls. This difference increases significantly at 25-30 months (figures 5, 6 and 7).

B. Agonistic interactions

Figures 8 and 9 show that the frequency and the duration of agonistic interactions are the same in both boys and girls. There is no significant different throughout the 3 age periods (figures 8 and 9).

Mother-toddler interaction

Table 2 shows :
1. Non-agonistic interaction

The mother-child dyad spent 50 % of the total observation time in non-agonistic exchanges (904/1800 seconds). The average duration of a non-agonistic interaction is 21.8 seconds.

a. Soliciting behaviour

The child solicited the mother 27 times during 30 minutes' observation and 77.7 % of these child solicitations received a response from the mother. The number of maternal solicitations was almost identical to those of the child (26.4) with 78.5 % child responses. There is an equal maternal and child contribution in the solicitation behaviour and reciprocity in the mother-child dyad.

b. Appeasing acts (smiling, laughing, stroking, kissing and offering)

The duration of these acts represents approximately 12 % of the duration of non-agonistic interactions (109/904 seconds) and 6 % of the total observation time. These acts are relatively short with an average duration of 3.5 seconds. The role played by the mother is preponderant in these acts i.e. 62.8 % (19.3 acts out of 30.7).

c. Imitating behaviour

The mother-child dyad presents a mean of 6 imitation sequences during the 30 minute observation period. The mean duration of a sequence is approximately 2.5 seconds. The mother initiates 81 % of this behaviour (4.9 sequences out of 6).

d. Looking behaviour

The mother looked at her child approximately 31 % of the total observation time. The mean duration of this behaviour is 9 seconds ; the child looked at the mother less often i.e. 4.8 % of the meal time. The mean duration of the child's looking at his mother is 5.4 seconds. Thus, the duration of this behaviour by the child is much shorter than that of the mother.
Reciprocal looking behaviour between mother and child.
The duration of this behaviour is 15.6 % of the total meal time with a mean duration for each reciprocal look of 6.8 seconds.

2. Agonistic exchanges (grasping, threatening, physical or verbal agression) .

The agonistic interactions between the mother and her child represents 5.6 % of the total observation time and approximately 10 % of the overall exchanges between both partners. The mean duration of an agonistic interaction is 3.7 seconds. It is to be noted that the child initiates most of these interactions (21 sequences out of 27).

Conclusions and Discussions

The results of this study lead to 6 types of conclusions :

1° - The non-agonistic interactions and the contact initiating behaviour with peers increases significantly at the

end of the second year and especially during the first half of the third year of the child's life.
The child develops and participates in interactions which become more and more stable and more and more complex (the interactions include at least 3 children).It can be thought that these modifications of the interaction systems are due to the skill of the young child in coding and decoding information coming from his environment. This skill is not only due to maturity, but also to the child's experience with his peers and the acquisition of certain mutual roles for initiating social interaction. BRONSON (1981) observed unacquainted children during their second year of age and found that the frequency of social interactions between these children to be very low and 40 - 58 % of the interactions were agonistic. Our results show that 21.6 % of interactions at 16-18 months and 12.3 % at 19-24 months are agonistic.
This difference in findings can perhaps be explained by the fact that contrary to BRONSON, this study dealt with children who had had previous experience with their peers. They had regularly attended the same institution for several months before this study began.
Some authors have shown the influence of familiarity between peers in social exchange (LEWIS and ROSENBLUM, 1975 ; BELSKY and STEINBERG, 1978). These authors suggest that the exchange between young children who know each other is better coordonated and more frequent. Several studies have confirmed this hypothesis (MUELLER and BRENNER, 1977 ; HOLMBERG, 1980 ; DOYLE and RIVEST, 1980).
However, many further studies are required to demonstrate the impact of early experience with peers on the development of the behavioural repertory and the communication system of the young child. The increase in frequency and the duration of non-agonistic social interactions can be due to the development of reciprocity in exchanges between young children. Towards the end of the second year the child begins to engage in further actions with reciprocal coordination which enables the children to maintain and extend their interactions.

2° - The agonistic interactions tend to decrease from 19 months. This confirms the results obtained by BRONSON (1981).
The decline in this type of interactions towards the end of the second year and the beginning of the third year can be explained in part by the development of channelling mechanisms for threats and aggression observed during the second year (MONTAGNER, 1978 ; RESTOIN et al., 1985) and the development of the child's ability to code and decode the signals coming from his peers. Early social interactions provide a better understanding of how the child's peer directed behaviour is organized for reciprocal contact initiating behaviour and open the way to mutual understanding ofthe other's intention. This can help decrease the agonistic interactions between young children.

3° - Even if dyadic interaction is the most frequent type of exchange between the child and his peers , the duration of

this type of interactions is the same as that for polyadic interactions.
These results show the importance of taking into account the duration of the polyadic interactions which were observed as early as at 16 and 18 months. The duration and the frequency of this interaction increases significantly at the beginning of the third year of the child's life. BRONSON (1974) observed during the second year 29 triadic interactions as against 904 dyadic interactions. This represents only 3.1 % of all the interactions (29 interactions out of933). Whereas in our study 27 % of the non-agonistic social interactions involved more than 2 children at 16-18 months, 39.4 % at 19-24 months and 37.2 % at 25-30 months. This difference with BRONSON'S results could be explained not only by the fact that the children she studied did not know each other, but also by the observation conditions.The observation situation can influence interaction (MUELLER and VANDELL, 1979; KONTAR, 1981).The feeding situation could encourage polyadic exchanges in young children.
The importance of this type of peer interaction must be underlined because exchanges between more than 2 children in the same interaction require highly developed coordination.
The study of child communicative competence is more complex than dyadic interactions would suggest. The child lives in a world surrounded by people and he must learn to communicate with several individuals at the same time and developed a specifie repertory to interact with a polyadic group.

4° - Boys more often than girls have social interactions and contact initiating behaviour with peers.Other research has presented the influence of biological, environmental (EIBL-EIBESFELDT, 1979 ; SCHIEFENHOVEL, 1982) and cognitive (WEINRAUB et al., 1984) factors in the child interaction process and the sex-differntiated socialization (JACKLIN and MACCOBY,1978; BLOCK, 1983).
LEWIS and WEINRAUB (1979) did not observe any behavioural differences between the two sexes during the first two years. In our results the difference of behaviour in boys and girls is observed between 19 and 24 months of age with the difference becomings more clear at the beginning of the third year.
According to MACCOBY and JACKLIN (1974) during the first years girls can have a greater langage development than boys whereas boys can be more active. The parents could reinforce differently agressive behaviour, competition and autonomy according to sex.
Our results do not show a significant difference between the two sexes in relation to agonistic behaviour. In studies of child aggression it would appear that boys are more often the victim and the initiator of aggression against a peer (WHITING and POPE quoted by MACCOBY and JACKLIN, 1974).
However, boys more often than girls have insistent aggressive behaviour in free play activities. The difference between the two sexes decreases in relation to agonistic interactions during which insistent aggression is rare in feeding situations (KONTAR, 1981 ; LAURENT, 1983).

5° - Mother-child interaction shows that there are relatively equal maternal and toddler contributions to the non agonistics interactions and the soliciting behaviour.However, each of the two partners can play a major role in one or another aspect of the exchange.During the mother-toddler interaction the toddler initiates most of the agonistic acts (77%) whereas the mother initiates most of the appeasing acts (63%) and imitation behaviour (81%).As well the behaviour of looking at the other partner is more often displayed by the mother than by the child.

6° - The comparaison between peer and mother-toddler interaction shows that the frequency of mother-toddler non agonistic and agonistic interaction is significantly higher than the frequency of these two types of interaction between the toddler and his peers at the age of 19 - 24 months ($p<.05$). However, the percentage of agonistic interaction is relatively the same in mother-toddler (10 %) and toddler-peer interaction (12 %).
Morover,the frequency of mother-child agonistic interaction is negatively correlated with the frequency of non agonistic interactions between the toddler and his peers.It is possible to speculate that when the toddler develops interactions with peers this may facilitate his social skills with his mother and he communicates with less and less agonistic interactions. This interpretation confirms the results of MUELLER (1979) and VANDELL (1979).However the direction of the effects may be inversed.
This study provides data to further our understanding of the multiple social relations in early childhood. Further invesigation is required to understand the genesis of developmental behaviour according to different contexts, family and institutional events and developmental characteristics.

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	AGE (in months)					
	16 - 18		19 - 24		25 - 30	
non-agonistic interactions	$\bar{x}$ 4.2 σ 2.3	78.4 %	5.4 2.4	87.7 %	8.2 2.3	91.2 %
agonistic interactions	$\bar{x}$ 1.16 σ 1.6	21.6 %	0.76 0.7	12.3 %	0.79 0.7	8.8 %
	$\bar{x}$ 5.36	100 %	6.16	100 %	8.99	100 %

Table 1 : Frequencies of social interactions with peers.

BEHAVIOUR		FREQUENCY $\bar{x}$	FREQUENCY σ	DURATION sec.
1- nonagonistic exchange	mother-toddler	41.4	8	904
a- soliciting behaviour	mother toward the toddler	26.4	8.1	517
	toddler toward the mother	27	6.6	513
b- appeasement behaviour	mother 's initiative	19.3	11	63
	toddler's initiative	11.3	8.8	45
c- imitating behaviour	mother imitating the toddler	4.9	3.5	11
	toddler imitating the mother	1.1	1	3
d- looking behaviour	mother looking at the child	61	15	561
	child looking at the mother	15.8	11	86
	mother-toddler reciprocity	41.8	21	282
2- agonistic exchange	mother's initiative	5.8	5.7	8
	todler's initiative	21	18	93

TABLE - 2 Frequency and duration (sec.) of mother-toddler behaviour per 30 minutes of observation.

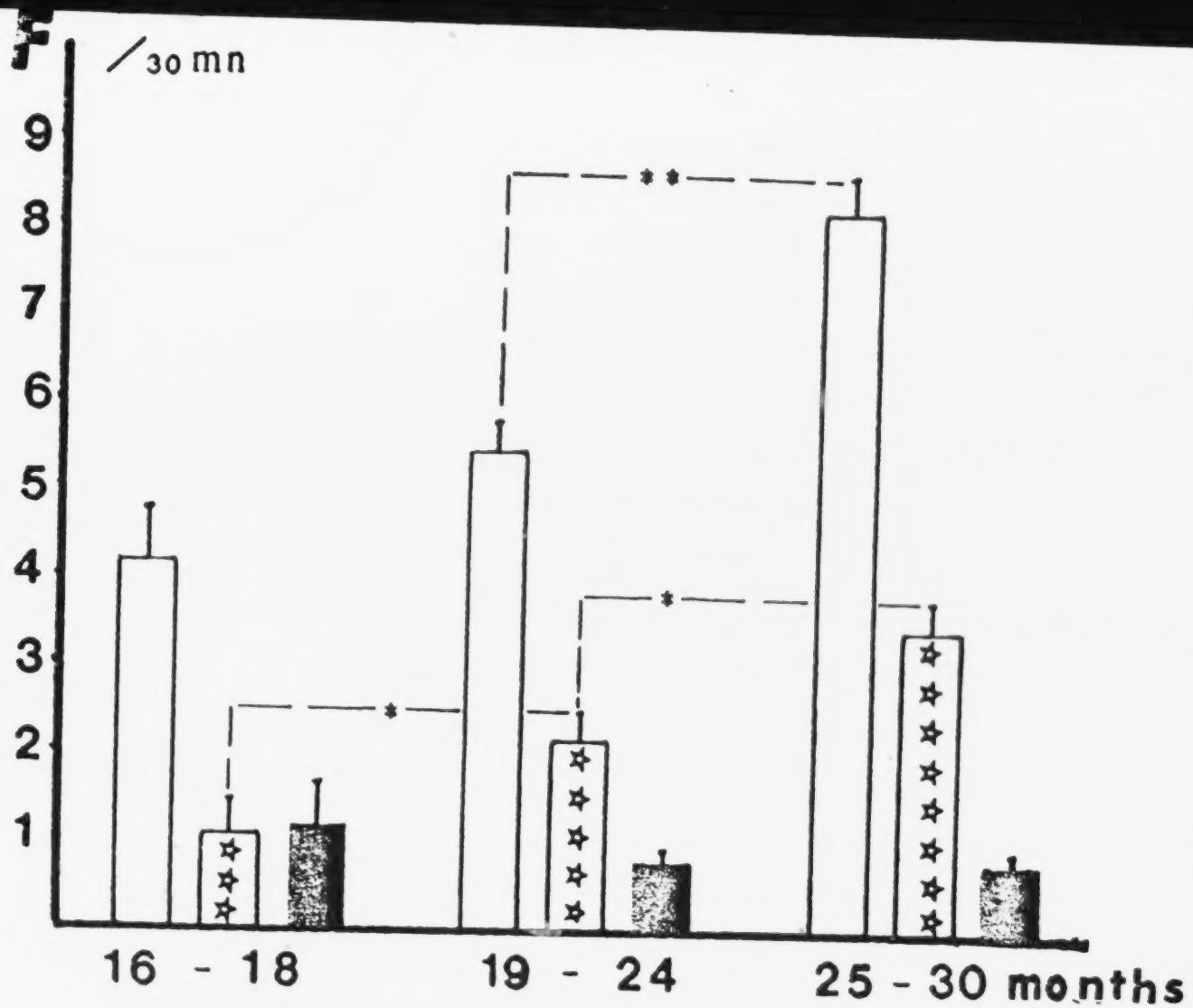

Figure 1 : Frequencies of social interactions with peers :

- non-agonistic interactions
- initiating contacts
- agonistic interactions

* p < .05
** p < .01

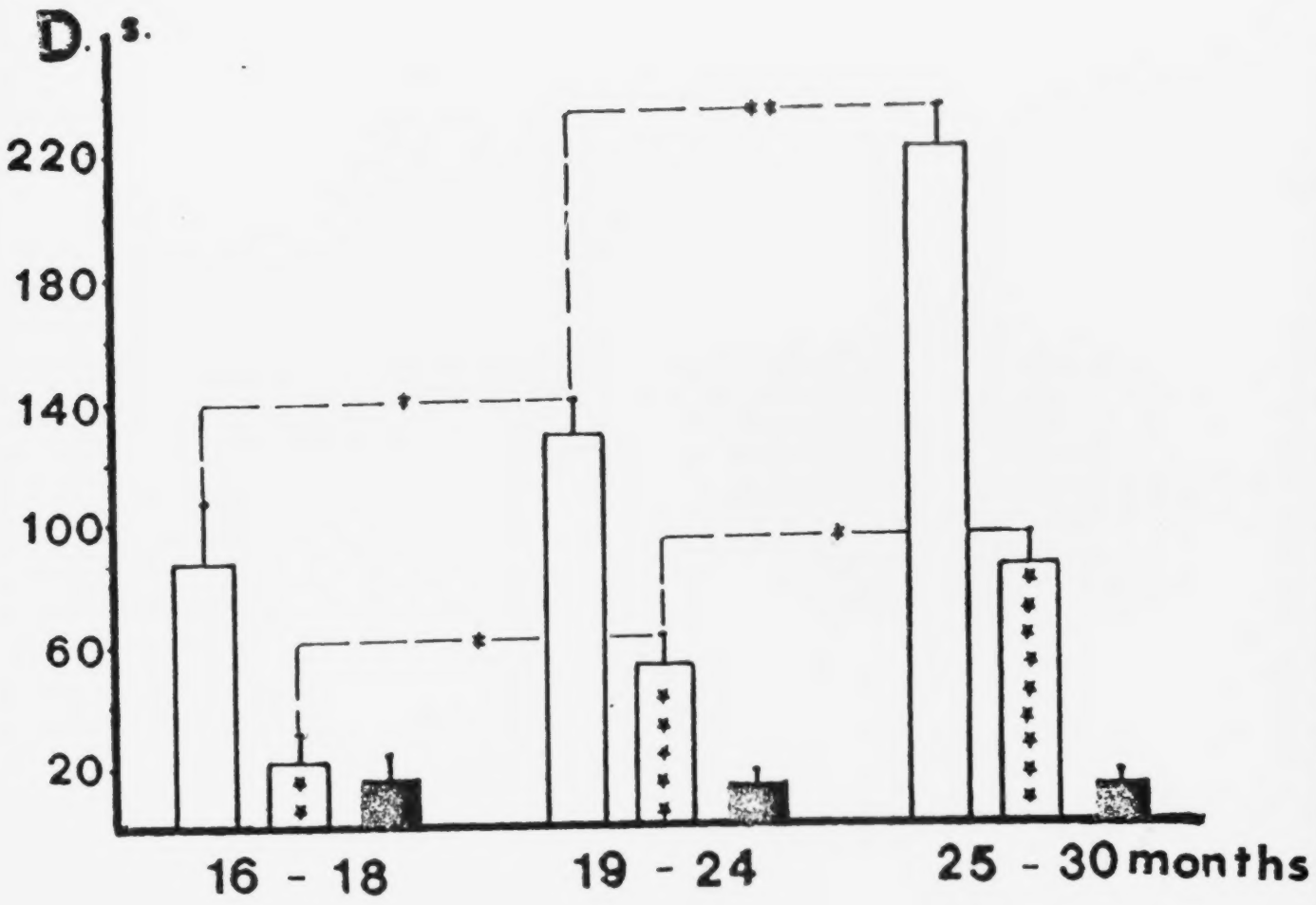

Figure 2 : Durations of social interactions with peers :

- non-agonistic interactions
- initiating contacts
- agonistic interactions

* p < .05
** p < .01

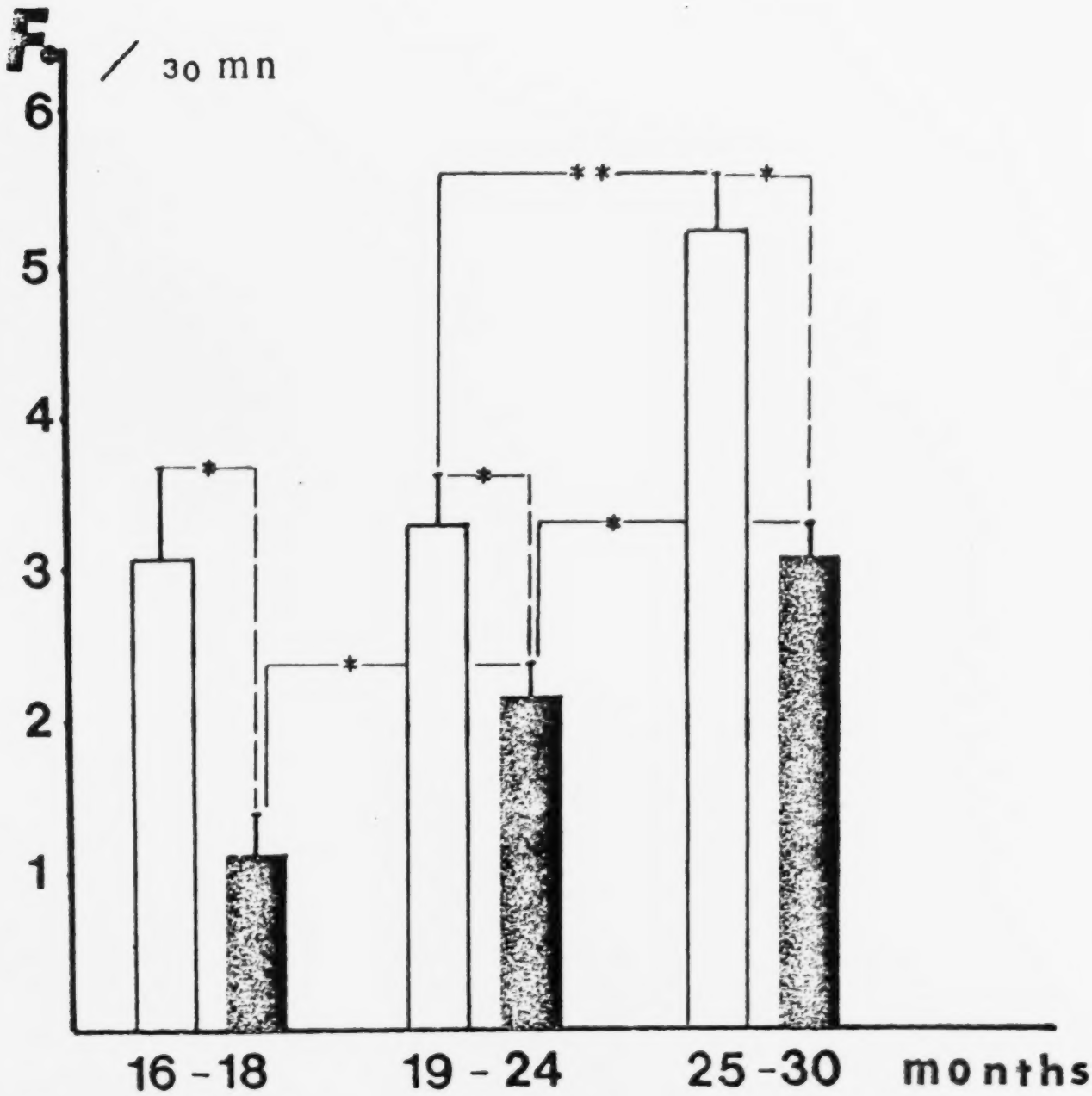

Figure 3 : Frequencies of social interactions with peers :

- dyadic interactions
- polyadic interactions

* p < .05
** p < .01

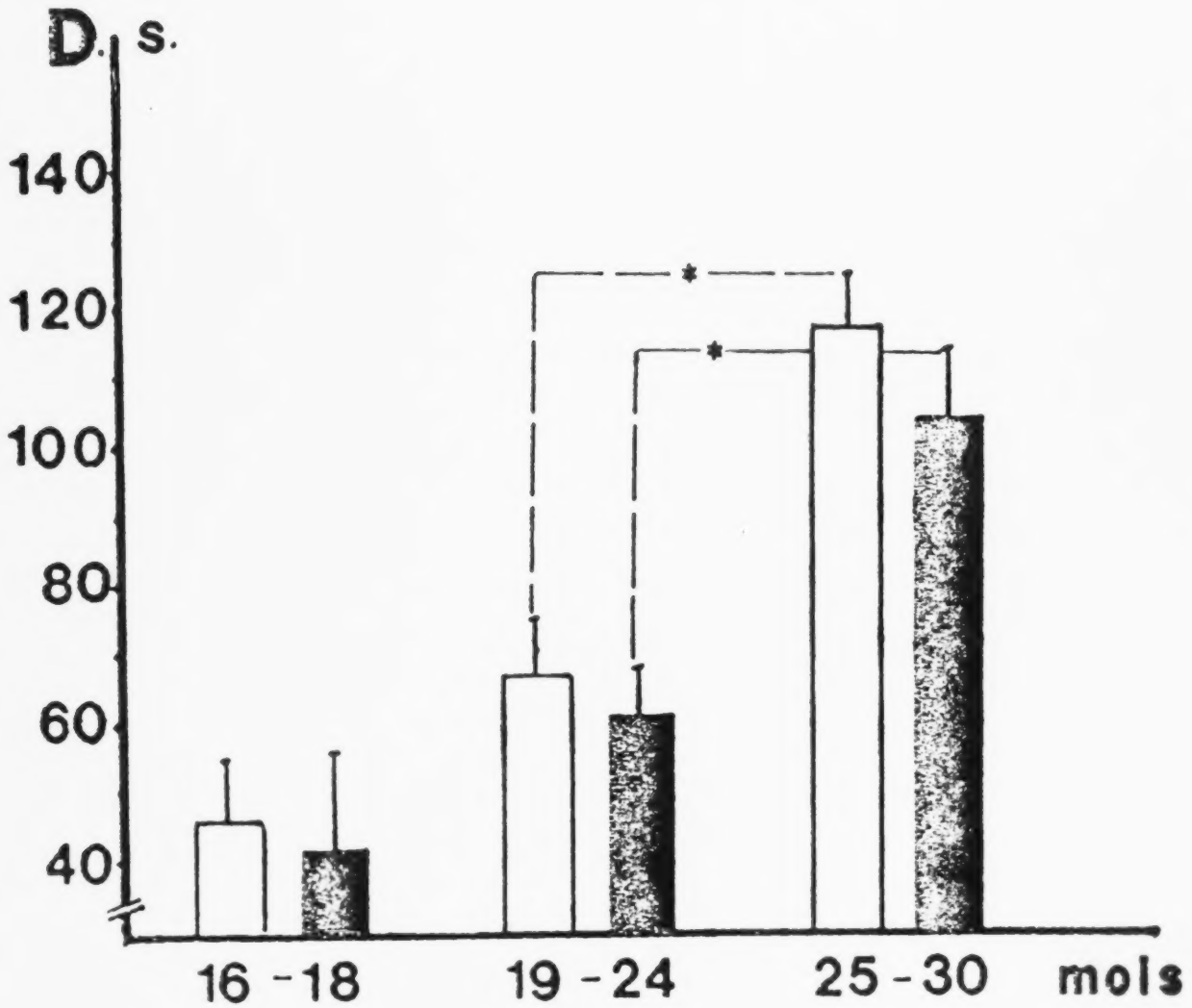

Figure 4 : Durations of social interactions with peers :

- dyadic interactions
- polyadic interactions

* p < .05
** p < .01

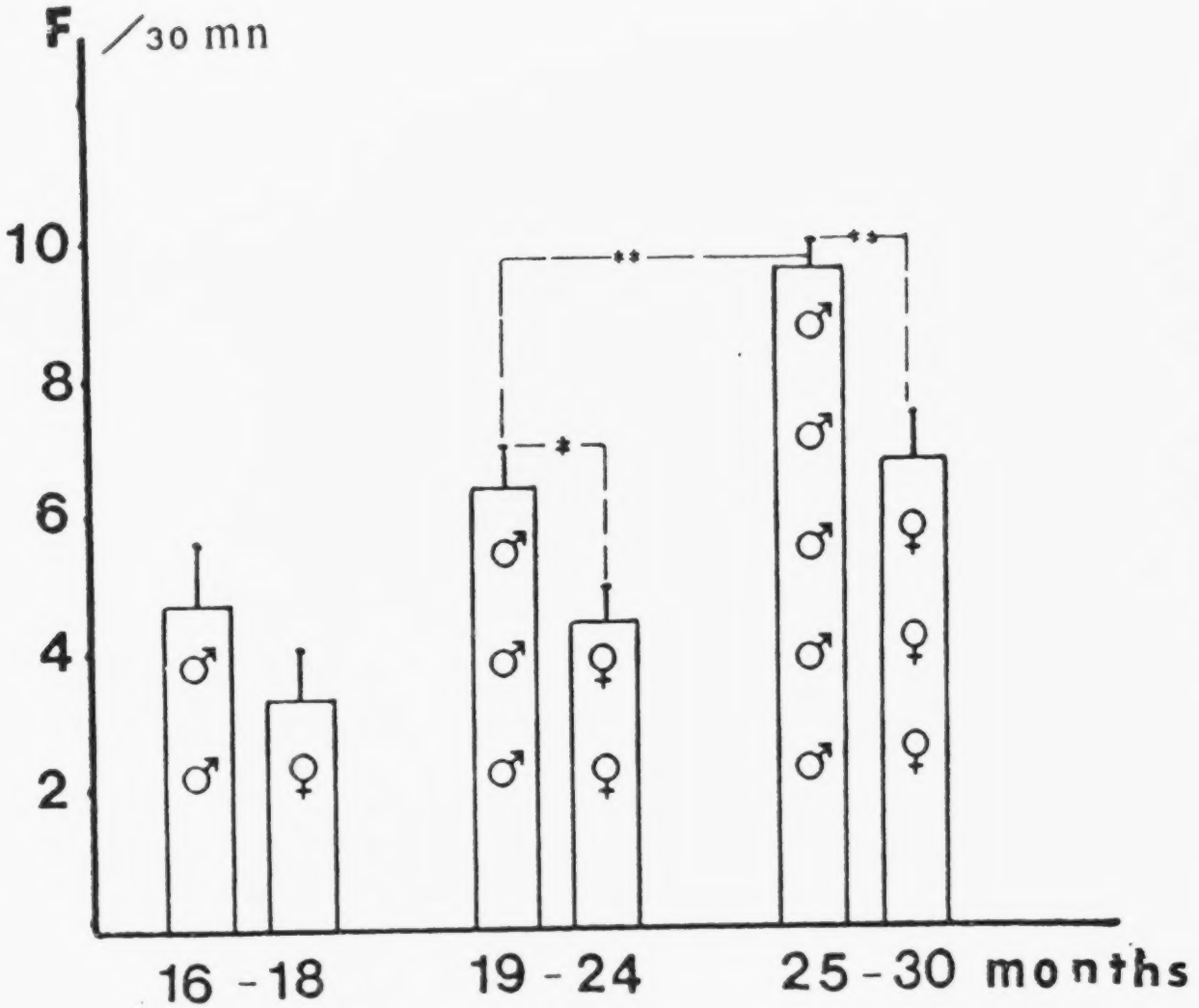

Figure 5 : Mean frequency of non-agonistic interactions with peers (boys ♂ and girls ♀)

* $p < .05$
** $p < .01$

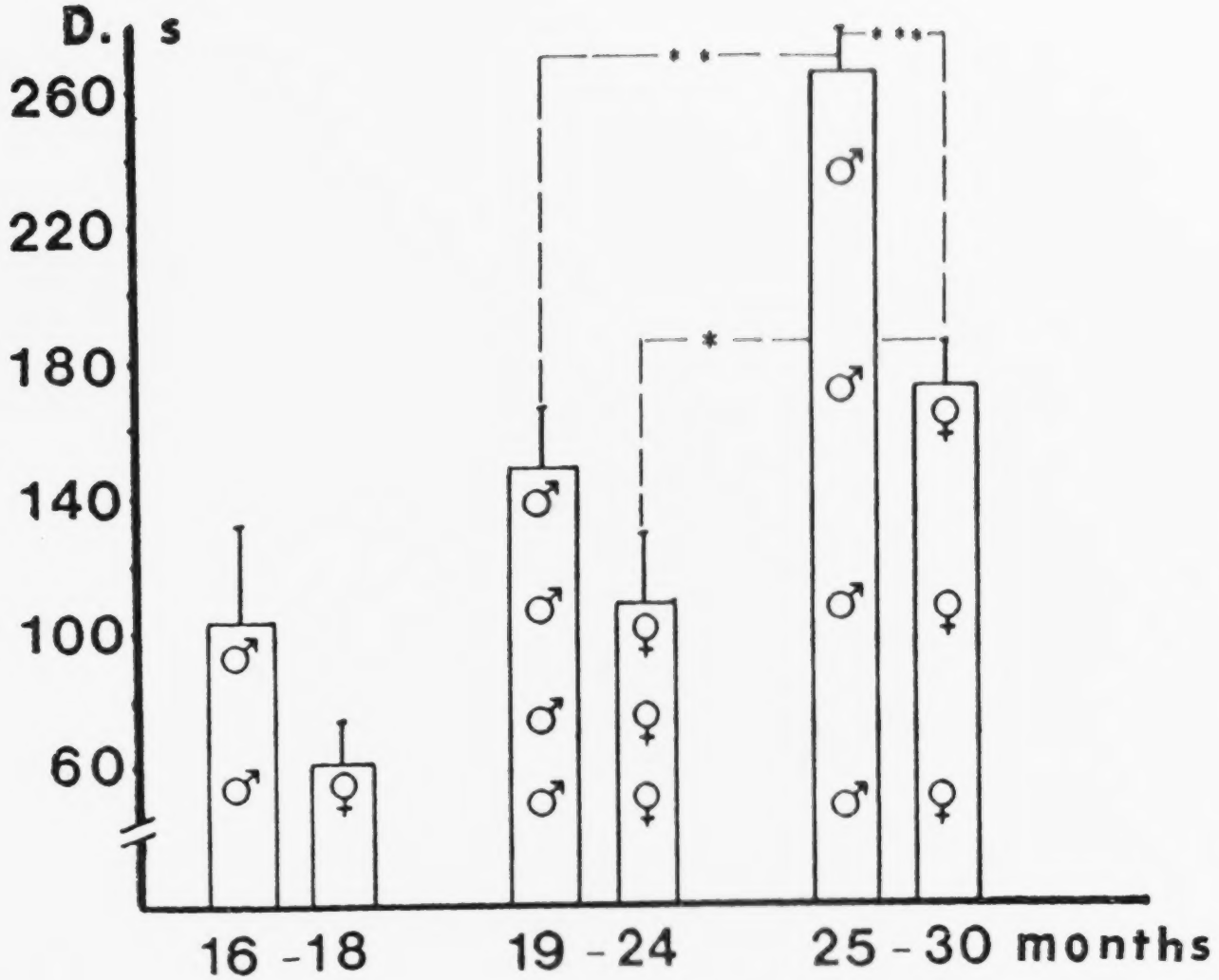

Figure 6 : Durations of non-agonistic interactions with peers (boys ♂ and girls ♀)

* $p < .05$
** $p < .01$

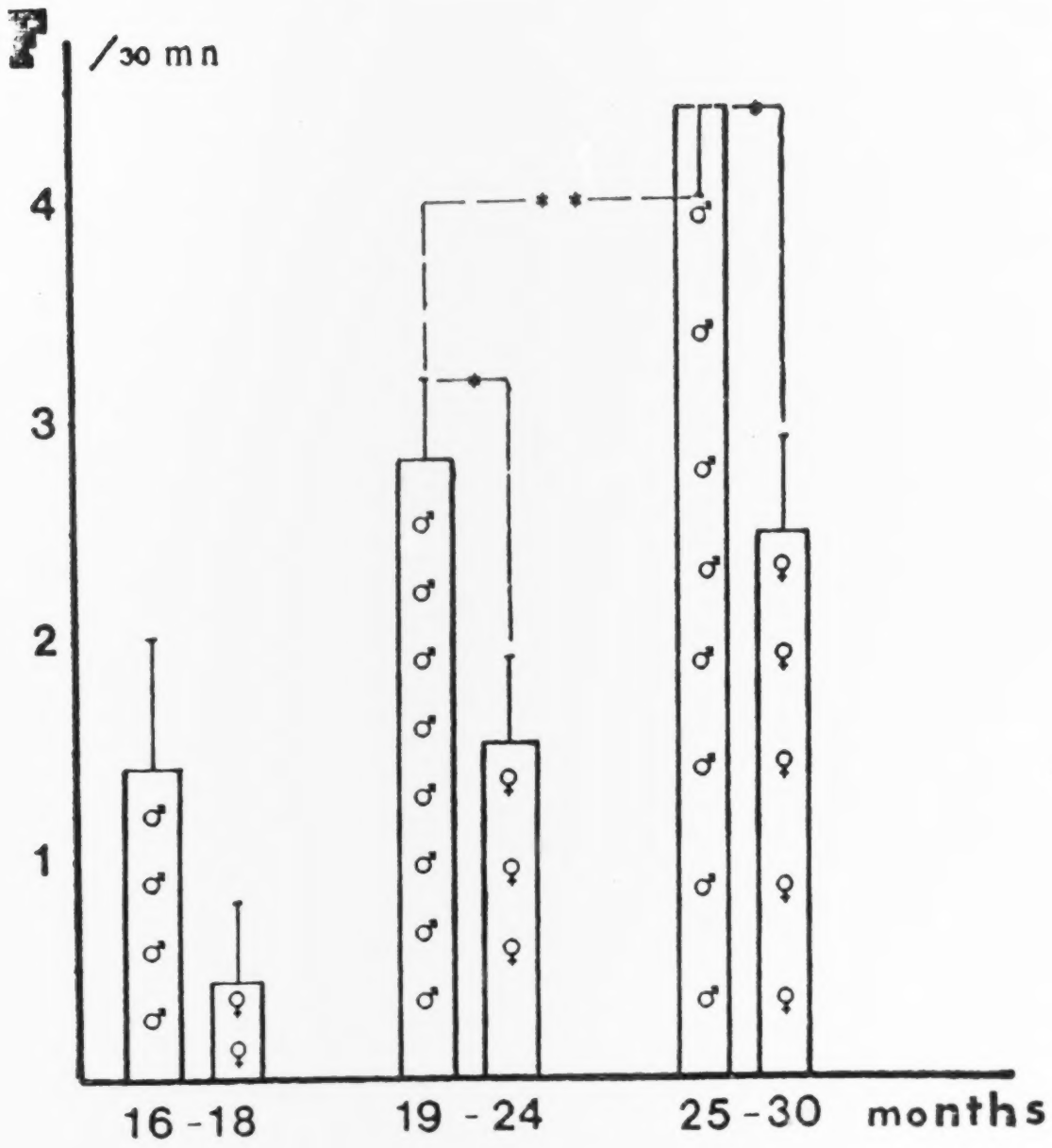

Figure 7 : Frequencies of initiating contacts with peers (boys ♂ and girls ♀)

* p < .05
** p < .01

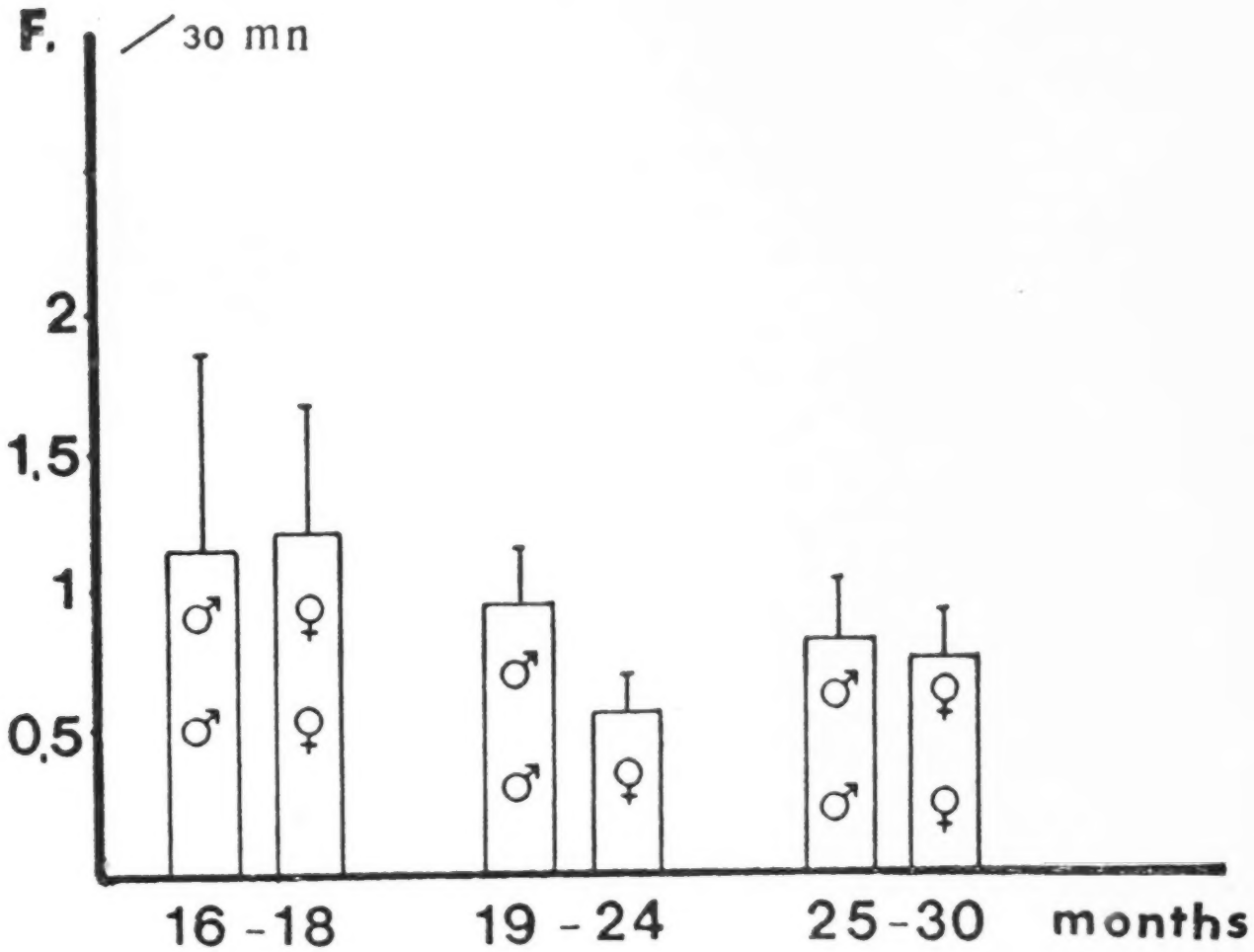

Figure 8 : Frequencies of agonistic interactions with peers (boys ♂ and girls ♀)

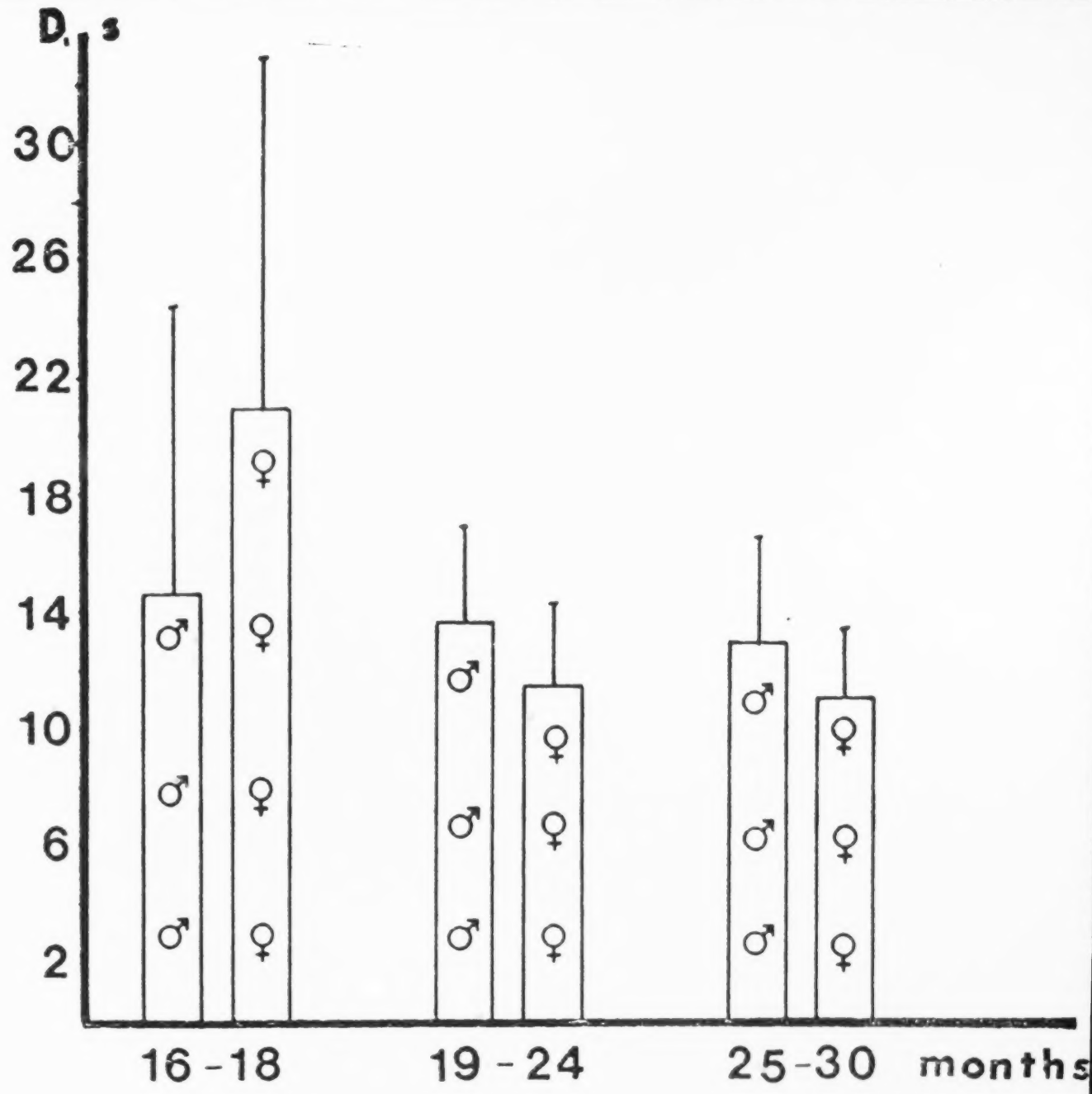

Figure 9 : Durations of agonistic interactions with peers (boys ♂ and girls ♀).